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PS3-16 Combination (Raman) Scattering Photons by the Channeling Particles

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The channeling particles is characterized by the bound quantum states of its transversal motion. Photon interactions with the channeling particles in a single crystal may be accompanied by the energy transitions between the transverse motion levels of channeling particles. The photon combination (Raman) scattering by the quasi-bound channeling particles leads to the appearance of a frequency combination of the incident photon frequency ω_0 and the frequency $\Delta\omega_{if}$, i.e.

$$\omega = \omega_0 \pm \Delta\omega_{if},$$

where $\Delta\omega_{if} = \frac{[\Delta E]_{if}}{\gamma}$; $[\Delta E]_{if}$ is the transition energy between “i” and “f” transversal motion quantum states; $\gamma = E/(mc^2)$ is the channeling particles Lorentz –factor. A “violet” satellite (“anti-Stokes” lines ω) analysis in the Raman combination scattering spectrum is suggested. Resonance conditions for observation of the second harmonics ($\omega = 2\omega_0$) is discussed.

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